

### The Claims Defining the Invention are as Follows

1. A coil assembly for a probe coil to be used in a system for detecting a nuclear quadrupole resonance signal in a substance, the coil assembly comprising a pair of opposed coil sections, each section consisting of a spiral coil arrangement having a spiral coil radially convolving outwardly from and about a centre point of the coil section.
2. A coil assembly according to claim 1, wherein the spiral coil arrangement is configured in a saddle shape, the saddle shape having a central portion and a pair of coextending outer portions, the central portions of the sections being disposed in opposing spaced apart relationship about a common axis coincident with the centre points of each coil section, and the corresponding coextending outer portions of the sections being disposed in confronting opposed alignment with each other to circumscribe a scanned volume within which the substance is to be disposed.
3. A coil assembly according to claim 1 or 2, wherein the winding of the coil is arranged so that the coil pitch varies along the radius of the coil.
4. A coil assembly according to any preceding claim, wherein the coil winding has a transverse extent that varies along the radius to maintain a constant gap between the windings.
5. A coil assembly according to any preceding claim, wherein the coil winding varies in accordance with a logarithmic winding scheme defined by the expression:

$$r_{n+1} / r_n = \ln(1 + a(n+1)) / \ln(1 + an)$$

where  $n$  is the number of spiral turns,  $a$  is a parameter used for optimisation,  $r_{n+1}$  and  $r_n$  are distances from the centre of the spiral to the  $(n+1)$ -th and the  $n$ -th turns.

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6. A coil assembly for a probe coil to be used in a system for detecting a nuclear quadrupole resonance signal in a substance, substantially as hereinbefore described by reference to the accompanying drawings.